10/648,740

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=> file biosis medline caplus wpids uspatfull
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                                                       ENTRY    SESSION
FULL ESTIMATED COST                                     0.21       1.32

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FILE 'USPATFULL' ENTERED AT 11:17:52 ON 14 FEB 2006
CA INDEXING COPYRIGHT (C) 2006 AMERICAN CHEMICAL SOCIETY (ACS)

*** YOU HAVE NEW MAIL ***

=> s synthes? (3a) oligo?
L1       71976 SYNTHES? (3A) OLIGO?

=> s l1 and solid suppot
L2           0 L1 AND SOLID SUPPOT

=> s l1 and solid support
L3       19485 L1 AND SOLID SUPPORT

=> s l3 and carbonate (4a) protect? (3a) group?
L4          25 L3 AND CARBONATE (4A) PROTECT? (3A) GROUP?

=> s l4 and simultan?
L5          21 L4 AND SIMULTAN?

=> s l5 and phosphite triester
L6          16 L5 AND PHOSPHITE TRIESTER

=> dup rem l6
PROCESSING COMPLETED FOR L6
L7           16 DUP REM L6 (0 DUPLICATES REMOVED)

=> d l7 bib abs 1-16

L7   ANSWER 1 OF 16  USPATFULL on STN
AN     2005:57493  USPATFULL
TI     Exocyclic amine triaryl methyl protecting groups in two step
       polynucleotide synthesis
IN     Dellinger, Douglas J., Boulder, CO, UNITED STATES
       Sierzchala, Agnieszka B., Boulder, CO, UNITED STATES
       Caruthers, Marvin H., Boulder, CO, UNITED STATES
PI     US 2005049411      A1   20050303
AI     US 2003-652064     A1   20030830 (10)
DT     Utility
FS     APPLICATION
LREP   AGILENT TECHNOLOGIES, INC., Legal Department, DL429, Intellectual
       Property Administration, P.O. Box 7599, Loveland, CO, 80537-0599
CLMN   Number of Claims: 21
ECL    Exemplary Claim: 1
DRWN   3 Drawing Page(s)
LN.CNT 1531
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB     Precursors for use in the synthesis of polynucleotides and methods of
       using the precursors in synthesizing polynucleotides are disclosed. The
       precursors include a heterocyclic base having an exocyclic amine group
```

and a substituted or unsubstituted triaryl methyl protecting group bound to the exocyclic amine group.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 2 OF 16 USPATFULL on STN
AN 2005:57489 USPATFULL
TI Precursors for two-step polynucleotide synthesis
IN Dellinger, Douglas J., Boulder, CO, UNITED STATES
Sierzchala, Agnieszka B., Boulder, CO, UNITED STATES
Caruthers, Marvin H., Boulder, CO, UNITED STATES
PI US 2005049407 A1 20050303
AI US 2003-652048 A1 20030830 (10)
DT Utility
FS APPLICATION
LREP AGILENT TECHNOLOGIES, INC., Legal Department, DL429, Intellectual Property Administration, P.O. Box 7599, Loveland, CO, 80537-0599
CLMN Number of Claims: 26
ECL Exemplary Claim: 1
DRWN 3 Drawing Page(s)
LN.CNT 1564
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB Precursors for use in the synthesis of polynucleotides are disclosed. The precursors include a heterocyclic base having an exocyclic amine group and a substituted or unsubstituted triaryl methyl protecting group bound to the exocyclic amine group.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 3 OF 16 USPATFULL on STN
AN 2005:56686 USPATFULL
TI Method for polynucleotide synthesis
IN Dellinger, Douglas J., Boulder, CO, UNITED STATES
Dellinger, Geraldine, Boulder, CO, UNITED STATES
Sierzchala, Agnieszka B., Boulder, CO, UNITED STATES
Caruthers, Marvin H., Boulder, CO, UNITED STATES
PI US 2005048601 A1 20050303
AI US 2003-652054 A1 20030830 (10)
DT Utility
FS APPLICATION
LREP AGILENT TECHNOLOGIES, INC., Legal Department, DL429, Intellectual Property Administration, P.O. Box 7599, Loveland, CO, 80537-0599
CLMN Number of Claims: 35
ECL Exemplary Claim: 1
DRWN 3 Drawing Page(s)
LN.CNT 2443
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB Methods of forming an internucleotide bond are disclosed. Such methods find use in synthesis of polynucleotides. The method involves contacting a functionalized support with a precursor having an exocyclic amine triaryl methyl protecting group under conditions and for a time sufficient to result in internucleotide bond formation. The functionalized support includes a **solid support**, a triaryl methyl linker group, and a nucleoside moiety having a reactive site hydroxyl, the nucleoside moiety attached to the **solid support** via the triaryl methyl linker group.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 4 OF 16 USPATFULL on STN
AN 2005:56582 USPATFULL
TI Cleavable linker for polynucleotide synthesis
IN Dellinger, Douglas J., Boulder, CO, UNITED STATES
Dellinger, Geraldine, Boulder, CO, UNITED STATES
Caruthers, Marvin H., Boulder, CO, UNITED STATES
PI US 2005048497 A1 20050303
AI US 2003-652063 A1 20030830 (10)
DT Utility
FS APPLICATION

LREP AGILENT TECHNOLOGIES, INC., Legal Department, DL429, Intellectual Property Administration, P.O. Box 7599, Loveland, CO, 80537-0599
CLMN Number of Claims: 23
ECL Exemplary Claim: 1
DRWN 2 Drawing Page(s)
LN.CNT 1803
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB Functionalized supports for polynucleotide synthesis are disclosed. The supports have linker moieties that are stable to conditions used in polynucleotide synthesis, but may be cleaved to release synthesized polynucleotides from the support. Methods of making the functionalized supports and methods of using are also disclosed.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 5 OF 16 USPATFULL on STN
AN 2005:56581 USPATFULL
TI Method of polynucleotide synthesis using modified support
IN Dellinger, Douglas J., Boulder, CO, UNITED STATES
Dellinger, Geraldine, Boulder, CO, UNITED STATES
Hargreaves, John, Mountain View, CA, UNITED STATES
PI US 2005048496 A1 20050303
AI US 2003-652049 A1 20030830 (10)
DT Utility
FS APPLICATION
LREP AGILENT TECHNOLOGIES, INC., Legal Department, DL429, Intellectual Property Administration, P.O. Box 7599, Loveland, CO, 80537-0599
CLMN Number of Claims: 31
ECL Exemplary Claim: 1
DRWN 3 Drawing Page(s)
LN.CNT 2081
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB Methods for polynucleotide synthesis using modified support materials are disclosed. The synthesis reaction typically involves concurrent oxidation and deprotection reactions. Upon synthesis of a desired polynucleotide, the completed polynucleotide may be released from the modified support materials.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 6 OF 16 USPATFULL on STN
AN 2004:292960 USPATFULL
TI Methods of **synthesizing oligonucleotides** using **carbonate protecting groups** and alpha-effect nucleophile deprotection
IN Dellinger, Douglas J., Sunnyvale, CA, UNITED STATES
Caruthers, Marvin H., Boulder, CO, UNITED STATES
Betley, Jason R., Edmunds Suffolk, UNITED KINGDOM
PI US 2004230052 A1 20041118
AI US 2003-648740 A1 20030825 (10)
RLI Continuation of Ser. No. US 2001-756991, filed on 8 Jan 2001, GRANTED, Pat. No. US 6630581 Division of Ser. No. US 1999-338179, filed on 22 Jun 1999, GRANTED, Pat. No. US 6222030 Continuation-in-part of Ser. No. US 1998-128052, filed on 3 Aug 1998, ABANDONED
DT Utility
FS APPLICATION
LREP AGILENT TECHNOLOGIES, INC., INTELLECTUAL PROPERTY ADMINISTRATION, LEGAL DEPT., P.O. BOX 7599, M/S DL429, LOVELAND, CO, 80537-0599
CLMN Number of Claims: 30
ECL Exemplary Claim: 1
DRWN 7 Drawing Page(s)
LN.CNT 1411
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The invention provides methods for **synthesizing oligonucleotides** using nucleoside monomers having **carbonate protected** hydroxyl **groups** that are deprotected with α-effect nucleophiles. The α-effect nucleophile irreversibly cleave the **carbonate protecting groups** while **simultaneously**

oxidizing the internucleotide **phosphite triester** linkage to a phosphodiester linkage. The procedure may be carried out in aqueous solution at neutral to mildly basic pH. The method eliminates the need for separate deprotection and oxidation steps, and, since the use of acid to remove protecting groups is unnecessary, acid-induced depurination is avoided. Fluorescent or other readily detectable **carbonate protecting groups** can be used, enabling monitoring of individual reaction steps during **oligonucleotide synthesis**. The invention is particularly useful in the highly parallel, microscale **synthesis** of **oligonucleotides**.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 7 OF 16 USPATFULL on STN
AN 2003:214617 USPATFULL
TI Process for the **synthesis** of **oligomeric** compounds
IN Cheruvallath, Zacharia S., San Diego, CA, UNITED STATES
Ravikumar, Vasulinga T., Carlsbad, CA, UNITED STATES
Cole, Douglas L., San Diego, CA, UNITED STATES
PA ISIS Pharmaceuticals, Inc., Carlsbad, CA (U.S. corporation)
PI US 2003149260 A1 20030807
US 6677471 B2 20040113
AI US 2002-290587 A1 20021108 (10)
RLI Continuation of Ser. No. US 2001-16465, filed on 11 Dec 2001, GRANTED, Pat. No. US 6521775 Division of Ser. No. US 1999-349659, filed on 8 Jul 1999, GRANTED, Pat. No. US 6399756 Continuation-in-part of Ser. No. US 1998-111678, filed on 8 Jul 1998, GRANTED, Pat. No. US 6326478
DT Utility
FS APPLICATION
LREP WOODCOCK WASHBURN LLP, ONE LIBERTY PLACE, 46TH FLOOR, 1650 MARKET STREET, PHILADELPHIA, PA, 19103
CLMN Number of Claims: 57
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 2248
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB Synthetic processes are provided wherein oligomeric compounds are prepared having phosphodiester, phosphorothioate, phosphorodithioate, or other covalent linkages. Also provided are synthetic intermediates useful in such processes.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 8 OF 16 USPATFULL on STN
AN 2003:38365 USPATFULL
TI Polynucleotide synthesis
IN Perbost, Michel G.M., Cupertino, CA, UNITED STATES
PI US 2003028012 A1 20030206
AI US 2002-245211 A1 20020917 (10)
RLI Continuation of Ser. No. US 1999-420099, filed on 18 Oct 1999, GRANTED, Pat. No. US 6451998
DT Utility
FS APPLICATION
LREP AGILENT TECHNOLOGIES, INC., Legal Department, DL429, Intellectual Property Administration, P.O. Box 7599, Loveland, CO, 80537-0599
CLMN Number of Claims: 24
ECL Exemplary Claim: 1
DRWN 4 Drawing Page(s)
LN.CNT 748
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB A method including coupling the moiety to a phospho or phosphite derivative of a protected alcohol, so as to form the corresponding phosphate or phosphite between the hydroxy and phospho or phosphite groups. The hydroxy group may be later de-protected by hydrolyzing the resulting compound to deprotect the protected alcohol and cleave the phosphate from the moiety so as to regenerate the hydroxy group of the moiety. The method has particular application to fabrication of addressable polynucleotide arrays and allows failed sequences, as well

as inter-feature regions, to be left with a free hydroxy group at the ends of the molecules (failed sequences or linkers) at such locations.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 9 OF 16 USPATFULL on STN
AN 2002:113056 USPATFULL
TI Synthesis of polynucleotides using combined oxidation/deprotection chemistry
IN Dellinger, Douglas J., Sunnyvale, CA, UNITED STATES
Perbost, Michael G. M., Bethany, CT, UNITED STATES
Caruthers, Marvin H., Boulder, CO, UNITED STATES
Betley, Jason R., Suffolk, UNITED KINGDOM
PI US 2002058802 A1 20020516
AI US 2001-916369 A1 20010727 (9)
RLI Continuation-in-part of Ser. No. US 2000-627249, filed on 28 Jul 2000, PENDING
DT Utility
FS APPLICATION
LREP AGILENT TECHNOLOGIES, INC., Legal Department, DL429, Intellectual Property Administration, P.O. Box 7599, Loveland, CO, 80537-0599
CLMN Number of Claims: 25
ECL Exemplary Claim: 1
DRWN 4 Drawing Page(s)
LN.CNT 1957
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB A method of synthesizing a polynucleotide which can, for example, be used during fabrication of an array. A second nucleoside is coupled to a first nucleoside through a phosphite linkage, with the second nucleoside having a hydroxyl protecting group that is a non-**carbonate protecting group**. The product of the foregoing step is exposed to a composition which both oxidizes the formed phosphite to a phosphate and deprotects the protected hydroxyl of the coupled nucleoside. The method has particular application to fabricating an addressable array of polynucleotides on a substrate which carries substrate bound moieties each with a hydroxyl group.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 10 OF 16 USPATFULL on STN
AN 2002:106412 USPATFULL
TI Process for the **synthesis** of **oligomeric** compounds
IN Cheruvallath, Zacharia S., San Diego, CA, UNITED STATES
Ravikumar, Vasulinga T., Carlsbad, CA, UNITED STATES
Cole, Douglas L., San Diego, CA, UNITED STATES
PA ISIS Pharmaceuticals. Inc. (U.S. corporation)
PI US 2002055623 A1 20020509
US 6521775 B2 20030218
AI US 2001-16465 A1 20011211 (10)
RLI Division of Ser. No. US 1999-349659, filed on 8 Jul 1999, PENDING
Continuation-in-part of Ser. No. US 1998-111678, filed on 8 Jul 1998, PATENTED
DT Utility
FS APPLICATION
LREP WOODCOCK WASHBURN LLP, One Liberty Place - 46th Floor, Philadelphia, PA, 19103
CLMN Number of Claims: 57
ECL Exemplary Claim: 1
DRWN No Drawings
LN.CNT 2243
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB Synthetic processes are provided wherein oligomeric compounds are prepared having phosphodiester, phosphorothioate, phosphorodithioate, or other covalent linkages. Also provided are synthetic intermediates useful in such processes.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 11 OF 16 USPATFULL on STN

AN 2002:85181 USPATFULL
TI · Solid phase **synthesis** of **oligonucleotides** using **carbonate protecting groups** and alpha-effect nucleophile deprotection
IN Dellinger, Douglas J., Sunnyvale, CA, UNITED STATES
Caruthers, Marvin H., Boulder, CO, UNITED STATES
Betley, Jason R., Bury St. Edmonds, UNITED KINGDOM
PI US 2002045221 A1 20020418
US 6630581 B2 20031007
AI US 2001-756991 A1 20010108 (9)
RLI Division of Ser. No. US 1999-338179, filed on 22 Jun 1999, UNKNOWN
DT Utility
FS APPLICATION
LREP AGILENT TECHNOLOGIES, Legal Department, 51 U-PD, Intellectual Property Administration, P. O. Box 58043, Santa Clara, CA, 95052-8043
CLMN Number of Claims: 52
ECL Exemplary Claim: 1
DRWN 7 Drawing Page(s)
LN.CNT 1526
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The invention provides a method for **synthesizing** **oligonucleotides** using **carbonate protection** of hydroxyl **groups** and nucleophilic deprotection reagents. The deprotection reagents irreversibly cleave the **carbonate** **protecting groups** while **simultaneously** oxidizing the internucleotide **phosphite triester** linkage, and can be used in aqueous solution at neutral to mildly basic pH. The method eliminates the need for separate deprotection and oxidation steps, and, since the use of acid to remove protecting groups is unnecessary, acid-induced depurination is avoided. Fluorescent or other readily detectable **carbonate protecting** **groups** can be used, enabling monitoring of individual reaction steps during **oligonucleotide synthesis**. The invention is particularly useful in the highly parallel, microscale **synthesis** of **oligonucleotides**. Reagents and kits for carrying out the aforementioned method are provided as well.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 12 OF 16 USPATFULL on STN
AN 2002:239168 USPATFULL
TI Capping and de-capping during **oligonucleotide** **synthesis**
IN Perbost, Michael G. M., Cupertino, CA, United States
PA Agilent Technologies, Inc., Palo Alto, CA, United States (U.S. corporation)
PI US 6451998 B1 20020917
AI US 1999-420099 19991018 (9)
DT Utility
FS GRANTED
EXNAM Primary Examiner: Richter, Johann; Assistant Examiner: Crane, L. Eric
LREP Stewart, Gordon M.
CLMN Number of Claims: 24
ECL Exemplary Claim: 10,11
DRWN 7 Drawing Figure(s); 4 Drawing Page(s)
LN.CNT 770
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB A method of capping a hydroxy group of a moiety, comprising coupling the moiety to a phosphor or phosphite derivative of a protected alcohol, so as to form the corresponding phosphate or phosphite between the hydroxy and phosphor or phosphite groups. The hydroxy group may be later de-capped by hydrolyzing the resulting compound to deprotect the protected alcohol and cleave the phosphate from the moiety so as to regenerate the hydroxy group of the moiety. The method has particular application to fabrication of addressable polynucleotide arrays and allows failed sequences, as well as inter-feature regions, to be left with a free hydroxy group at the ends of the molecules (failed sequences or linkers) at such locations.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 13 OF 16 USPATFULL on STN
AN 2002:130084 USPATFULL
TI Process for the **synthesis** of **oligomeric** compounds
IN Cheruvallath, Zacharia S., San Diego, CA, United States
Ravikumar, Vasulinga T., Carlsbad, CA, United States
Cole, Douglas L., San Diego, CA, United States
PA ISIS Pharmaceuticals, Inc., Carlsbad, CA, United States (U.S. corporation)
PI US 6399756 B1 20020604
AI US 1999-349659 19990708 (9)
RLI Continuation-in-part of Ser. No. US 1998-111678, filed on 8 Jul 1998, now abandoned
DT Utility
FS GRANTED
EXNAM Primary Examiner: Geist, Gary; Assistant Examiner: Crane, L. E.
LREP Woodcock Washburn LLP
CLMN Number of Claims: 52
ECL Exemplary Claim: 1
DRWN 0 Drawing Figure(s); 0 Drawing Page(s)
LN.CNT 2423
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB Synthetic processes are provided wherein oligomeric compounds are prepared having phosphodiester, phosphorothioate, phosphorodithioate, or other covalent linkages. Also provided are synthetic intermediates useful in such processes.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 ANSWER 14 OF 16 USPATFULL on STN
AN 2001:60049 USPATFULL
TI Solid phase **synthesis** of **oligonucleotides** using **carbonate protecting groups** and alpha-effect nucleophile deprotection
IN Dellinger, Douglas J., Sunnyvale, CA, United States
Caruthers, Marvin H., Boulder, CO, United States
Betley, Jason R., Bury St. Edmunds, United Kingdom
PA Agilent Technologies, Inc., Palo Alto, CA, United States (U.S. corporation)
PI US 6222030 B1 20010424
AI US 1999-338179 19990622 (9)
RLI Continuation-in-part of Ser. No. US 1998-128052, filed on 3 Aug 1998
DT Utility
FS Granted
EXNAM Primary Examiner: Riley, Jezia
CLMN Number of Claims: 39
ECL Exemplary Claim: 1
DRWN 8 Drawing Figure(s); 7 Drawing Page(s)
LN.CNT 1476
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The invention provides a method for **synthesizing** **oligonucleotides** using **carbonate protection** of hydroxyl **groups** and nucleophilic deprotection reagents. The deprotection reagents irreversibly cleave the **carbonate protecting groups** while **simultaneously** oxidizing the intemucleotide **phosphite triester** linkage, and can be used in aqueous solution at neutral to mildly basic pH. The method eliminates the need for separate deprotection and oxidation steps, and, since the use of acid to remove protecting groups is unnecessary, acid-induced depurination is avoided. Fluorescent or other readily detectable **carbonate protecting** **groups** can be used, enabling monitoring of individual reaction steps during **oligonucleotide synthesis**. The invention is particularly useful in the highly parallel, microscale **synthesis** of **oligonucleotides**. Reagents and kits for carrying out the aforementioned method are provided as well.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L7 *ANSWER 15 OF 16 WPIDS COPYRIGHT 2006 THE THOMSON CORP on STN
AN 2000-225901 [20] WPIDS
CR 2005-513718 [53]
DNC C2000-069092
TI **Oligonucleotide synthesis** by phosphoramidite method using **carbonate protecting group** and deprotecting reagent that **simultaneously** oxidizes **phosphite triester** linkage to phosphotriester linkage.
DC B04 D16 J04
IN BETLEY, J R; CARUTHERS, M H; DELLINGER, D J
PA (AGIL-N) AGILENT TECHNOLOGIES INC; (HEWP) HEWLETT-PACKARD CO; (BETL-I) BETLEY J R; (CARU-I) CARUTHERS M H; (DELL-I) DELLINGER D J
CYC 26
PI EP 984021 A2 20000308 (200020)* EN 34
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI
US 6222030 B1 20010424 (200125)
US 2002045221 A1 20020418 (200228)
US 6630581 B2 20031007 (200374)
US 2004230052 A1 20041118 (200477)
EP 984021 B1 20050427 (200532) EN
R: DE FR GB
DE 69924930 E 20050602 (200538)
ADT EP 984021 A2 EP 1999-306168 19990803; US 6222030 B1 CIP of US 1998-128052 19980803, US 1999-338179 19990622; US 2002045221 A1 Div ex US 1999-338179 19990622, US 2001-756991 20010108; US 6630581 B2 CIP of US 1998-128052 19980803, Div ex US 1999-338179 19990622, US 2001-756991 20010108; US 2004230052 A1 CIP of US 1998-128052 19980803, Div ex US 1999-338179 19990622, Cont of US 2001-756991 20010108, US 2003-648740 20030825; EP 984021 B1 EP 1999-306168 19990803; DE 69924930 E DE 1999-624930 19990803, EP 1999-306168 19990803
FDT US 6630581 B2 Div ex US 6222030; US 2004230052 A1 Div ex US 6222030, Cont of US 6630581; DE 69924930 E Based on EP 984021
PRAI US 1999-338179 19990622; US 1998-128052 19980803;
US 2001-756991 20010108; US 2003-648740 20030825
AN 2000-225901 [20] WPIDS
CR 2005-513718 [53]
AB EP 984021 A UPAB: 20050818
NOVELTY - **Oligonucleotide synthesis** comprises condensing the 3'- or 5'-OH group of a supported (oligo)nucleoside with a nucleoside phosphoramidite having a protected OH group, to form an intermediate where the (oligo)nucleoside is bound to the nucleoside by a **phosphite triester** linkage; and deprotecting the intermediate with a reagent which also oxidizes the **phosphite triester** linkage.

DETAILED DESCRIPTION - **Oligonucleotide synthesis** process comprises:

(a) condensing the 3'- or 5'-hydroxy group of a support-bound nucleoside or oligonucleotide with a monomeric nucleoside phosphoramidite having a **carbonate-protected** hydroxy **group**, to form an intermediate in which the support-bound nucleoside or oligonucleotide is bound to the monomeric nucleoside through a **phosphite triester** linkage; and

(b) treating the intermediate with a deprotecting reagent capable of removing the **carbonate protecting group** and **simultaneously** oxidizing the **phosphite triester** linkage to a phosphotriester linkage.

INDEPENDENT CLAIMS are also included for the following:

(A) a method for making an oligonucleotide array made up of array features, each presenting a specified oligonucleotide sequence at an address on a substrate, comprising: providing a hydroxyl-derivatized array substrate and treating the array substrate to protect the hydroxyl groups on the derivatized surface from reaction with phosphoramidites; and then iteratively carrying out the steps of (i) applying droplets of an alpha effect nucleophile to effect deprotection of the hydroxyl groups at selected addresses, and (ii) flooding the array substrate with a medium containing a selected monomeric nucleoside phosphoramidite having a **carbonate-protected** hydroxyl **group**, to permit

covalent attachment of the selected nucleoside to the deprotected hydroxyl groups at the selected addresses;

(B) a kit for **synthesizing** an **oligonucleotide** on a **solid support**, comprising: a hydroxyl-derivatized support surface; a protecting group for protecting hydroxyl groups on the derivatized support surface; at least one protected nucleoside; at least one nucleoside phosphoramidite; a nucleophile that exhibits an alpha effect at neutral to mildly basic pH; and reagents suitable for establishing pH and for carrying out reactions of deprotection, phosphoramidite coupling and oxidation to form an internucleotide phosphotriester linkage; and

(C) a nucleoside monomer of formula (I) or (II).

B = a purine or pyrimidine base;

R = H or OH;

R1 = COOR3;

R3 = optionally substituted hydrocarbyl;

R2 = a group of formula (i);

X = NQ1Q2;

Q1, Q2 = alkyl, aryl, aralkyl, alkaryl, cycloalkyl, alkenyl, cycloalkenyl, alkynyl or cycloalkynyl, optionally containing one or more nonhydrocarbyl linkages and optionally C-substituted by nonhydrocarbyl substituents, or are linked to form a mono- or polyheterocyclic ring; and

Y = H or hydrocarbyl.

USE - The process has utility in the fields of biochemistry, molecular biology, pharmacology, and medical diagnostics and screening.

ADVANTAGE - The **carbonate protecting group** can be removed at neutral to mildly basic pH, thus avoiding acid-induced depurination. Deprotection and phosphite oxidation are effected **simultaneously**, eliminating the need for a separate oxidation step. The deprotecting agent also removes exocyclic amine protecting groups. Detectable protecting groups can be used to enable monitoring of individual reaction steps. The process can be used to perform 3'-to-5' or 5'-to-3' syntheses and readily lends itself to highly parallel microscale **oligonucleotide synthesis**.

Dwg.0/7

L7 ANSWER 16 OF 16 USPATFULL on STN

AN 1999:63399 USPATFULL

TI 5'to 3' nucleic acid synthesis using 3'-photoremovable protecting group

IN Pirrung, Michael C., Houston, TX, United States
Shuey, Steven W., Durham, NC, United States
Bradley, Jean-Claude, Durham, NC, United States

PA Duke University, Durham, NC, United States (U.S. corporation)

PI US 5908926 19990601

AI US 1995-406327 19950316 (8)

DT Utility

FS Granted

EXNAM Primary Examiner: Kunz, Gary L.

LREP Nixon & Vanderhye P.C.

CLMN Number of Claims: 20

ECL Exemplary Claim: 1

DRWN No Drawings

LN.CNT 635

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates, in general, to a method of synthesizing a nucleic acid, and, in particular, to a method of effecting 5' to 3' nucleic acid synthesis. The method can be used to prepare arrays of oligomers bound to a support via their 5' end. The invention also relates to a method of effecting mutation analysis using such arrays. The invention further relates to compounds and compositions suitable for use in such methods.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

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=> d his

     (FILE 'HOME' ENTERED AT 11:14:26 ON 14 FEB 2006)

     FILE 'STNGUIDE' ENTERED AT 11:17:30 ON 14 FEB 2006

     FILE 'HOME' ENTERED AT 11:17:35 ON 14 FEB 2006

     FILE 'BIOSIS, MEDLINE, CAPLUS, WPIDS, USPATFULL' ENTERED AT 11:17:52 ON
     14 FEB 2006
L1         71976 S SYNTHES? (3A) OLIGO?
L2             0 S L1 AND SOLID SUPPOT
L3         19485 S L1 AND SOLID SUPPORT
L4            25 S L3 AND CARBONATE (4A) PROTECT? (3A) GROUP?
L5            21 S L4 AND SIMULTAN?
L6            16 S L5 AND PHOSPHITE TRIESTER
L7            16 DUP REM L6 (0 DUPLICATES REMOVED)
L8             9 S L4 NOT L7
L9             7 DUP REM L8 (2 DUPLICATES REMOVED)

=> s l4 and phosphite
L10          21 L4 AND PHOSPHITE

=> s l10 not l7
L11           5 L10 NOT L7

=> dup rem l11
PROCESSING COMPLETED FOR L11
L12           3 DUP REM L11 (2 DUPLICATES REMOVED)

=> d l12 bib abs 1-3

L12  ANSWER 1 OF 3  USPATFULL on STN
AN     2004:314490  USPATFULL
TI     Releasable polymer arrays
IN     Cuppoletti, Andrea, Livermore, CA, UNITED STATES
       McGall, Glenn H., Palo Alto, CA, UNITED STATES
PA     Affymetrix, INC., Santa Clara, CA (U.S. corporation)
PI     US 2004248162      A1   20041209
AI     US 2004-791005     A1   20040302 (10)
RLI    Continuation-in-part of Ser. No. US 2003-738381, filed on 16 Dec 2003,
       PENDING
PRAI   US 2002-434144P     20021217 (60)
DT     Utility
FS     APPLICATION
LREP   AFFYMETRIX, INC, ATTN: CHIEF IP COUNSEL, LEGAL DEPT., 3380 CENTRAL
       EXPRESSWAY, SANTA CLARA, CA, 95051
CLMN   Number of Claims: 32
ECL    Exemplary Claim: 1
DRWN   No Drawings
LN.CNT 1394
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB     Methods are provided for fabricating an array of polymers wherein the
       polymers may be released from the surface of the array by activation of
       a cleavable moiety. Also provided are arrays of polymers having of
       polymers wherein the polymers can be released from the surface of the
       array by activation of a releasable group. Arrays of nucleic acids
       wherein a nucleic acid probe may be released from the array by
       activation of a releasable groups and methods for fabrication of such
       arrays are also disclosed.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L12  ANSWER 2 OF 3  BIOSIS  COPYRIGHT (c) 2006 The Thomson Corporation  on STN
     DUPLICATE 1
AN   2004:144635  BIOSIS
DN   PREV200400146581
TI   Solid-phase oligodeoxynucleotide synthesis: A two-step
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cycle using peroxy anion deprotection.
AU Sierzchala, Agnieszka B.; Dellinger, Douglas J.; Betley, Jason R.; Wyrzykiewicz, Tadeusz K.; Yamada, Christina M.; Caruthers, Marvin H. [Reprint Author]
CS Department of Chemistry and Biochemistry, University of Colorado, Boulder, CO, 80309, USA
doug_dellinger@agilent.com; marvin.caruthers@colorado.edu
SO Journal of the American Chemical Society, (November 5 2003) Vol. 125, No. 44, pp. 13427-13441. print.
ISSN: 0002-7863 (ISSN print).
DT Article
LA English
ED Entered STN: 17 Mar 2004
Last Updated on STN: 17 Mar 2004
AB A novel solid-phase phosphoramidite based **oligodeoxynucleotide** two-step **synthesis** method has been developed. Keys to this method are replacement of the 5'-dimethoxytrityl blocking group with an aryloxycarbonyl and the use of N-dimethoxytrityl protection for the exocyclic amines of adenine and cytosine. With these modifications, coupling of each 2'-deoxynucleoside 3'-phosphoramidite to the growing oligodeoxynucleotide on the **solid support** can be followed by treatment with an aqueous mixture of peroxy anions buffered at pH 9.6. This reagent effectively removes the **carbonate protecting group** and simultaneously oxidizes the **phosphite** internucleotide linkage. As a consequence a new two-step synthesis cycle is possible. **Oligodeoxynucleotides synthesized** using this approach are identical to authentic samples when tested by a variety of analytical techniques.

L12 ANSWER 3 OF 3 WPIDS COPYRIGHT 2006 THE THOMSON CORP on STN
AN 2002-156732 [21] WPIDS
CR 2002-499520 [53]
DNC C2002-049016
TI Synthesis of polynucleotide useful during fabrication of an array involves coupling nucleoside phosphoramidite and a solid-supported nucleoside and treating the product with an oxidation/deprotection composition.
DC B04 D16
IN BETLEY, J R; CARUTHERS, M; DELLINGER, D J; PERBOST, M G M
PA (AGIL-N) AGILENT TECHNOLOGIES INC
CYC 26
PI EP 1176151 A1 20020130 (200221)* EN 36
R: AL AT BE CH CY DE DK ES FI FR GB GR IE IT LI LT LU LV MC MK NL PT RO SE SI TR
ADT EP 1176151 A1 EP 2001-118360 20010727
PRAI US 2000-627249 20000728
AN 2002-156732 [21] WPIDS
CR 2002-499520 [53]
AB EP 1176151 A UPAB: 20020823
NOVELTY - Synthesis of a polynucleotide involves coupling a second nucleoside to a first nucleoside through a **phosphite** linkage, where the second nucleoside has a non-**carbonate protecting group protecting** a hydroxyl, and exposing the product to a composition which concurrently oxidizes the phosphate formed to a phosphate and deprotects the protected hydroxyl of the second nucleoside.
DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for the following:
(1) a method of fabricating an addressable array of polynucleotides on a substrate carrying substrate bound groups, each with a hydroxyl group, comprising, at each multiple different substrate addresses:
(a) coupling a second nucleoside to a first nucleoside through a **phosphite** linkage, where the second nucleoside has a non-**carbonate protecting group protecting** a hydroxyl, and exposing the product to a composition which concurrently oxidizes the phosphate formed to a phosphate and deprotects the protected hydroxyl of the second nucleoside; and
(b) repeating step (a) where the deprotected hydroxyl of the coupled nucleoside in one cycle serves as the hydroxyl group of substrate bound groups in the next cycle, so as to for the addressable array with

different polynucleotide sequences at different addresses.

(2) a method for making an oligonucleotide array comprising:

(a) treating a hydroxyl-derivatized array substrate to protect hydroxyl groups on the derivatized surface from reaction with phosphoramidites;

(b) applying droplets of an alpha effect nucleophile to carry out deprotection of hydroxyl moieties at the selected addresses; and

(c) flooding the array substrate with a medium containing a selected monomeric nucleoside phosphoramidite having a **carbonate-protected** hydroxyl **group**, to permit covalent attachment of the selected nucleoside to the deprotected hydroxyl groups at the selected addresses.

The oligonucleotide array has array features each presenting a specified oligonucleotide sequence at an address on (c).

USE - The method is useful for synthesizing the polynucleotide; for carrying out either 3' to 5' or 5' to 3' synthesis; and for fabricating an addressable array of polynucleotide on a substrate (claimed).

ADVANTAGE - The method provides concurrent oxidation of the internucleoside linkage and removal of the hydroxyl protecting group, eliminating the extra step present in conventional process for **synthesizing oligonucleotides**. The process requires no washings and the water may optionally be eliminated, the thorough washing to remove water prior to the coupling step in the next cycle is not required or may be reduced.

Dwg.0/6

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